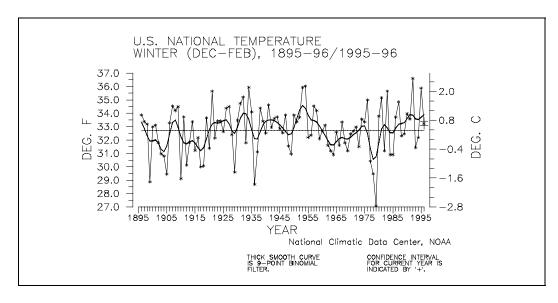
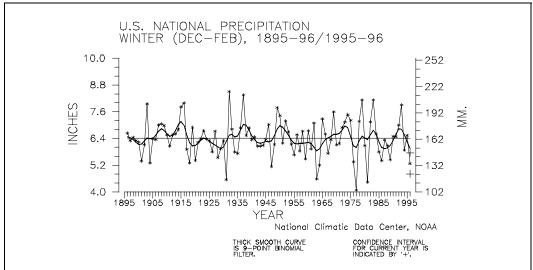
Volume 8 Number 2

CLIMATE VARIATIONS BULLETIN







This CLIMATE VARIATIONS BULLETIN (CVB) is a preliminary report that puts current monthly climate anomalies into historical perspective using climate databases archived at the National Climatic Data Center (NCDC). It is issued on a monthly basis. Supplemental sections are included which address seasonal and annual perspectives, when appropriate.

Current data are based on preliminary reports from First and Second Order airport stations obtained from the National Weather Service (NWS) Climate Analysis Center, and preliminary tornado statistics obtained from the NWS National Severe Storms Forecast Center. THE CURRENT DATA SHOULD BE USED WITH CAUTION. These preliminary data are useful for estimating how current anomalies compare to the historical record, however the actual values and rankings for the current year will change as the final data arrive at NCDC and are processed.

The following NCDC datasets are used for the historical data: the climate division drought database (TD-9640), the hurricane datasets (TD-9636 and TD-9697), the tornado dataset (STORM DATA), and the monthly station dataset (LCD supplemental files). It should be noted that the climate division drought database consists of monthly data for 344 climate divisions in the contiguous United States. These divisional values are calculated from the 6000+ station Cooperative Observer network.

The narrative, tables, and graphs in the CVB are also available via automated facsimile. The previous month's summary can be obtained after the tenth of the month by dialing 704-271-4570 and selecting the appropriate menu codes. A touch-tone fax machine is required.

If you have access to the Internet, copies of the CVB are available via both the NCDC's World Wide Web (WWW) server and the NCDC's anonymous FTP server.

NCDC's WWW server

URL for the CVB: http://www.ncdc.noaa.gov/publications/cvb/cvb.html

NCDC's anonymous FTP server

Machine: ftp.ncdc.noaa.gov Directory: /pub/data/cvb

If you are a climate researcher and would like to order copies of the historical datasets used to make graphs of the type in this report, call 704-271-4994 or fax a letter to 704-271-4876 or mail a letter to the address given below, ATTN: Research User Services.

All other questions or requests for data should be made by calling 704-271-4800 or sending a fax to 704-271-4876 or by writing to:

National Climatic Data Center, NOAA
Federal Building
151 Patton Avenue, Room 120
Asheville, NC 28801-5001

If you use any of the information from this CVB, please identify "National Climatic Data Center, NOAA" as the source.

UNITED STATES FEBRUARY CLIMATE IN HISTORICAL PERSPECTIVE

William O. Brown
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Global Climate Lab, Global Analysis Branch
Federal Building
Asheville, NC 28801 USA

Preliminary data for February 1996 indicate that temperature averaged across the contiguous United States was above the long-term mean (see Figure 1). February 1996, with an averaged temperature of 36.0° (F), ranked as the 32nd warmest February since national records began in 1895. The 1996 value is based on preliminary data, which has been shown to be within 0.34°F (0.19°C) of the final data over a 7-year period. This confidence interval is indicated in the figure by '+'. The darker smooth curve is a nine-point binomial filter that averages out the year-to-year fluctuations and shows the longer-term variations. Roughly twelve percent of the country averaged much warmer than normal while none of the country averaged much cooler than normal for February 1996.

With an areally-averaged national precipitation value of 1.38 inches, February 1996 was the 7th driest February on record. The preliminary value for precipitation is estimated to be accurate to within 0.15 inches (3.81 millimeters) and the confidence interval is plotted in Figure 2 as a '+'. Nearly 40% of the country experienced much drier than normal conditions while only four percent was much wetter than normal. February 1996 marked the second consecutive such month with precipitation well below the long-term mean.

Historical precipitation is shown in a different way in Figure 3. The February precipitation for each climate division in the contiguous U.S. was first standardized using the gamma distribution over the 1931-90 period. These gamma-standardized values were then weighted by area and averaged to determine a national standardized precipitation value. These national weighted values were then normalized over their period of record. Negative values are drier and positive values are wetter than the mean. This index gives a more accurate indication of how precipitation across the country compares to the local normal (60-year average) climate. The preliminary national standardized precipitation ranked February 1996 as the 2nd driest such month on record. This standardized zscore is estimated to be accurate to within 0.122 index

units and the confidence interval is plotted in Figure 3 as an 'X'.

National averaged temperature for the two-month period January-February 1996 is shown in Figure 4. Temperature for the two-month period was only slightly above the long-term mean ranking as the 47th warmest such period since 1895.

In order to show more of a historical perspective, the precipitation and temperature rankings for the periods September 1995-February 1996 and March 1995-February 1996, the February 1996 temperature rankings and categorical precipitation standings for the nine climatically homogeneous regions, as well as the national rankings, are listed in Table 1.

The regional rankings for temperature for the month of February indicate that temperatures were cooler than normal for the eastern half and warmer than normal for the western half of the country excluding the Northwest region. February 1996 was the 39th coolest February on record for the Northwest region (Figure 5). An abundance of cloud cover and precipitation is at least partially responsible for this anomaly. The Northeast region had the 35th warmest February since 1895 while the Southeast had the 42nd coolest February on record. It was the 11th warmest February for the Southwest region (Figure 6) and the 19th warmest February on record for the West region.

Every region of the country except the Northwest and West regions were within the dry-third of the historical distribution. Thanks to a rather persistent onshore flow, compliments of a Pacific-originated storm track, the Northwest and West regions were within the wet-third of the distribution.

Figure 7A shows, in illustrative map form, the February 1996 temperature rankings for the 48 contiguous states. Three states were within the top ten warmest of the historical distribution. February 1996 was the third warmest such month for Arizona, sixth warmest for New Mexico and the eighth warmest for

Maine. Twelve other states were within the warm-third of the distribution. No state was within the top ten coolest category of the historical distribution for the month of February while only three states (DE, FL, & WA) were within the cool third of the distribution.

February 1996 state categorical ranks for precipitation are shown in Figure 7B. Five states ranked within the wet-third of the historical distribution while 32 states ranked within the dry third. It should also be noted that these February state categorical precipitation ranks are preliminary and should be used with considerable caution due to the high variability of precipitation on a small space and time scale.

Long-term drought coverage in the United States during February increased while the area of the country experiencing severe to extreme wetness dropped roughly five percent. Nationally, long-term drought conditions (as defined by the Palmer Drought Index) for February 1996 increased to about ten percent of the country while the percent coverage of severe to extreme wet area fell to about an seventh of the country (Figure 8). Table 2 lists the precipitation ranks and statistics for selected river basins for the 1995-1996 Hydrologic Year. The core wet areas included the northern Great Plains, upper Mississippi valley, the northern Rockies, and portions of the interior Northwest. The Palmer dry areas included the entire Southwest region, the Great Basin, central and southern Rockies, central and southern High Plains, central and southern Plains, middle and lower Mississippi valley region, and portions of the Northeast and Mid-Atlantic regions.

Precipitation across the Primary Hard Red Winter Wheat Belt for the five-month period averaged much below normal for the October 1995 through February 1996 growing season-to-date and now stands at near-record lows (Figure 9). Not since the growing season of 1966-67 have precipitation deficits been comparable.

Table 3 shows extremes, 1961-90 normals, and the February 1996 values for both precipitation and temperature for the nine regions and the contiguous U.S.

According to preliminary data from the National Weather Service's National Severe Storms Forecast Center, there were 13 tornadoes across the contiguous United States in February 1996. The 1953-1995 average tornado count for February is 20. Only two tornadoes were reported in February 1964 while 83

were documented in February 1971. It should be noted that the preliminary tornado count is generally higher than the final count.

Preliminary winter (December-February) data for 1995-96 indicate that temperature averaged across the contiguous United States was above the long-term mean (Figure 10), ranking as the 46th warmest winter on record (Table 4). About one-seventh of the country averaged much warmer than normal while about one percent averaged much cooler than normal for the winter season.

Areally-averaged winter precipitation for the nation was below the long-term mean, ranking winter season 1995-96 as the seventh driest such season in the 101-year record (Figure 11). The national standardized precipitation index (Figure 12) ranked winter 1995-96 as the fourth driest winter on record. (The preceding monthly report explains how this index is computed.) More than a third of the contiguous United States averaged much drier than normal for December-February 1995-96, while about seven percent experienced much wetter than normal conditions.

The temperature ranks and precipitation categorical ranks for the winter season, December 1995 through February 1996, for the nine climatically homogeneous regions in the United States are listed in Table 4. The average winter temperature pattern was characterized by a simple ridge-trough pattern, with unusual warmth in the west and temperatures slightly below normal from the northern Plains to the Southeast and northward. The preliminary data indicate that the Southeast region had the 22nd coolest winter season since 1895-96 (Figure 13) while the West region ranked fifth warmest (Figure 15) and Southwest sixth warmest (Table 4).

The winter season precipitation categorical rankings (Table 4) show a wet season occurred for the Northwest region, reflecting numerous Pacific storms during the three-month period. The West, Northeast, and East-North Central regions were all in the mid-third of the distribution while the remainder of the country was drier than normal for winter season 1995-96.

Table 5 shows extremes, 1961-1990 normals, and the 1996 winter season values for both precipitation and temperature for the nine regions and the contiguous U.S.

Figure 14A shows, in illustrative map form, the Winter 1995-96 temperature rankings for the 48 contiguous states. Three states were within the top ten warmest of the historical distribution. Winter 1995-96 was the second warmest such season for Arizona, fourth warmest for California, and seventh warmest for New Mexico. Eight other states were within the warm third of the historical distribution. No state was within the top ten coolest category of the historical distribution for the season while twenty states were within the cool third of the distribution.

Winter state categorical ranks for precipitation are shown in Figure 14B. Eight states ranked within the wet third of the distribution while 27 states ranked within the dry third. As with the February statistics, it should be noted that these categorical precipitation ranks are preliminary and should be used with considerable caution.

According to preliminary data from the National Weather Service's National Severe Storms Forecast Center, there were 56 tornadoes across the contiguous United States during the three-month winter season. The 1953-1994 average winter tornado count is 53. The extremes: 149 tornadoes in 1983 and 13 in 1985. It should be noted that the preliminary tornado count is generally higher than the final count and that the tornado observations have generally improved with time as better observing practices and instrumentation (especially weather radar and satellites) were utilized.

TABLE 1. PRECIPITATION AND TEMPERATURE RANKS, BASED
ON THE PERIOD 1895-1996. 1 = DRIEST/COLDEST,
102 = WARMEST FOR FEBRUARY 1996 TEMPERATURES,
101 = WETTEST/WARMEST FOR SEP 1995-FEB 1996,
101 = WETTEST/WARMEST FOR MAR 1995-FEB 1996.
PRESENT MONTH PRECIPITATION EXPRESSED CATEGORICALLY:
WET = WET 1/3 OF THE HISTORICAL DISTRIBUTION,
MID = WITHIN THE MIDDLE 1/3 OF THE DISTRIBUTION,
DRY = DRY 1/3 OF THE HISTORICAL DISTRIBUTION.

REGION		SEP 1995- FEB 1996		
PRECIPI'	PRECIPITATION:			
NORTHEAST	DRY	92	23	
EAST NORTH CENTRAL	DRY	63	78	
CENTRAL	DRY	17	46	
SOUTHEAST	DRY	65	60	
WEST NORTH CENTRAL	DRY	67	97	
SOUTH	DRY	5	32	
SOUTHWEST	DRY	2	28	
NORTHWEST	WET	89	98	
WEST	WET	31	86	
NATIONAL	DRY	23	64	
TEMPERA'	TEMPERATURE:			
NORTHEAST	68	30	53	
EAST NORTH CENTRAL	59	13	31	
CENTRAL	59	17	41	
SOUTHEAST	42	18	36	
WEST NORTH CENTRAL	71	40	33	
SOUTH	71	54	46	
SOUTHWEST	92	100	90	
NORTHWEST	39	79	71	
WEST	84	101	87	
NATIONAL	71	55	59	

TABLE 2.

STATISTICS FOR SELECTED RIVER BASINS:

AREAL PERCENT OF THE BASIN EXPERIENCING SEVERE OR

EXTREME LONG-TERM (PALMER) DROUGHT, AND AREAL PERCENT

OF THE BASIN EXPERIENCING SEVERE OR EXTREME LONG-TERM

(PALMER) WET CONDITIONS, AS OF FEBRUARY 1996.

RIVER BASIN REGIONS AS DEFINED BY THE U.S. WATER

RESOURCES COUNCIL.

RIVER BASIN	% AREA DRY	
	2.1% .0% 35.4%	
GREAT BASIN UPPER COLORADO BASIN LOWER COLORADO BASIN RIO GRANDE BASIN	12.5% .0% 59.6% 39.2%	
TEXAS GULF COAST BASIN	. 0 응	.0%
LOWER MISSISSIPPI BASIN GREAT LAKES BASIN OHIO RIVER BASIN TENNESSEE RIVER BASIN	.0% 4.6%	.0% 6.7% .0% .0%
NEW ENGLAND BASIN MID-ATLANTIC BASIN SOUTH ATLANTIC-GULF BASIN	. 0 %	7.7% .0% 5.1%

TABLE 3. EXTREMES, 1961-90 NORMALS, AND 1996 VALUES FOR FEBRUARY. IT SHOULD BE NOTED THAT THE 1996 VALUES WILL CHANGE DUE TO THE USE OF A DENSER STATION NETWORK.

	PRECI	PITATION (IN WETTEST	ICHES)	
	DRIEST	WETTEST	NORMAL	1996
REGION	VALUE YEA	AR VALUE YEAR	PCPN	PCPN
NODELLEAGE	70 100	NG	0 65	0 16
NORTHEAST EAST NORTH CENTRAL CENTRAL	./0 198	37 5.43 1900	2.65	Z.16
EAST NORTH CENTRAL	.31 198	$\frac{3}{2}$, $\frac{40}{1922}$.95	./8
CENTRAL	.6/ 194	1 5.46 1909	2.64	1.54
COUTUENCT	1 26 190	9 7 16 1903	1 15	2 11
SOUTHEAST WEST NORTH CENTRAL SOUTH	20 103	00	4.13	26
WEST NORTH CENTRAL	.30 190 55 100	06	2 20	.50
SOUTHWEST NORTHWEST	.14 197	2 2.07 1980	. 80	. 42
NORTHWEST	.69 192	20 5.95 1904	2.86	4.26
WEST	. 21 196	6.49 1986	2.27	2.81
2_	V== => 0		_ • _ ·	
NATIONAL	.96 194	17 3.05 1903	1.98	1.38*
	4 DDDI T.	4 T N T N T T T T T T T T T T T T T T T	COMPTEN	ran
		IINARY VALUE, 7AL + OR		
	TNIERV	AL + UR	13 INCHES	•
	тг.мрт	RATHRE (DEGR	(FES F)	
	COLDEST	RATURE (DEGR WARMEST	NORMAI.	1996
REGION	VALUE YEZ	AR VALUE YEAR	TEMP	TEMP
NORTHEAST	11.6 193	34 31.6 1984	23.3	25.2
EAST NORTH CENTRAL	1.1 193	86 29.6 1954	17.6	17.8
		78 41.8 1930		
SOUTHEAST	37.8 189	56.4 1927	47.1	47.0
WEST NORTH CENTRAL	2.7 193	34.5 1954	22.2	23.5
SOUTH	33.7 190	53.5 1930	45.2	48.0
		3 42.8 1995 3 39.7 1963		
SOUTHWEST	25.1 190	3 42.8 1995	35.9	39.8
NORTHWEST	23.3 193	39.7 1963	33.5	32.0
TITOT				

32.6 1903 48.8 1963 42.7 44.9

26.3 1899 42.1 1954 34.3 36.0*

WEST

NATIONAL

^{*} PRELIMINARY VALUE, CONFIDENCE INTERVAL + OR - .3 DEG. F.

TABLE 4. TEMPERATURE AND PRECIPITATION RANKINGS FOR DEC 1995FEB 1996, BASED ON THE PERIOD 1895-96 TO 1995-96.

1 = COLDEST, 101 = HOTTEST.

PRECIPITATION EXPRESSED CATEGORICALLY:
WET = WET 1/3 OF THE HISTORICAL DISTRIBUTION,
MID = WITHIN THE MIDDLE 1/3 OF THE DISTRIBUTION,
DRY = DRY 1/3 OF THE HISTORICAL DISTRIBUTION.

REGION	PRECIPITATION	TEMPERATURE
NORTHEAST	MID	36
EAST NORTH CENTRAL	MID	30
CENTRAL	DRY	39
SOUTHEAST	DRY	22
WEST NORTH CENTRAL	DRY	45
SOUTH	DRY	66
SOUTHWEST	DRY	96
NORTHWEST	WET	65
WEST	MID	97
NATIONAL	DRY	56

TABLE 5. EXTREMES, 1961-90 NORMALS, AND 1995-96 VALUES FOR DECEMBER-FEBRUARY

	PRECIPITATION (INCHES) DRIEST WETTEST NORMAL 1996 EGION VALUE YEAR VALUE YEAR PCPN PCPN						
		DRIE	EST	WET	rest	NORMAL	1996
REGION							PCPN
NORTHEAST EAST NORTH CENTRAL	CENTRAL	4.56 1.61 4.24	1980 1931 1963	13.97 5.55 17.30	1979 1969 1950	8.94 3.50 8.60	8.52 3.50 6.80
SOUTHEAST WEST NORTH SOUTH	CENTRAL	.84 3.57	1931 1918	2.90 13.12	1969 1932	1.81 6.88	1.51 4.00
SOUTHWEST NORTHWEST WEST		.93 3.86 2.52	1904 1977 1977	6.53 15.73 15.87	1993 1965 1969	2.58 10.69 7.18	1.02 12.50 8.47
NATIONAL		4.08	1977	8.50	1932	6.35	5.28*
	* PRELIMINARY VALUE, CONFIDENCE INTERVAL + OR47 INCHES						
		TH	EMPERA	ATURE	(DEGRE	EES F)	
		COLI	DEST	WARI	MEST	ES F) NORMAL	1996
REGION				VALUE		TEMP	
NORTHEAST EAST NORTH CENTRAL	CENTRAL	8.4	1936	24.5	1987	16.4	15.5
SOUTHEAST WEST NORTH SOUTH	CENTRAL	9.5	1979		1992	19.4	18.9

 27.3
 1933
 38.4
 1981
 33.2
 36.7

 21.7
 1949
 37.2
 1934
 30.5
 31.4

 31.7
 1949
 43.9
 1981
 39.9
 43.0

27.1 1979 36.6 1992 32.3 33.2*

SOUTHWEST NORTHWEST

NATIONAL

WEST

^{*} PRELIMINARY VALUE, CONFIDENCE INTERVAL + OR - .2 DEG. F.

U.S. NATIONAL TEMPERATURE FEBRUARY, 1895-1996

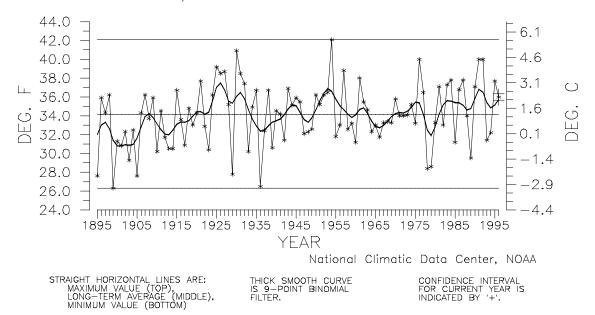


Figure 1

U.S. NATIONAL PRECIPITATION FEBRUARY, 1895-1996

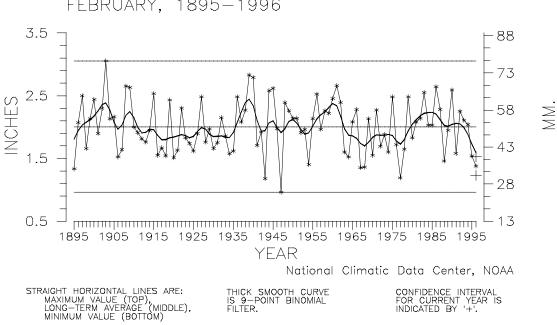
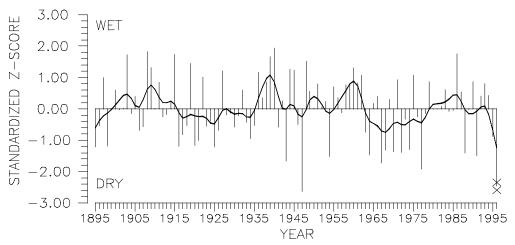


Figure 2

U.S. NATIONAL NORMALIZED PRECIPITATION INDEX FEBRUARY, 1895-1996



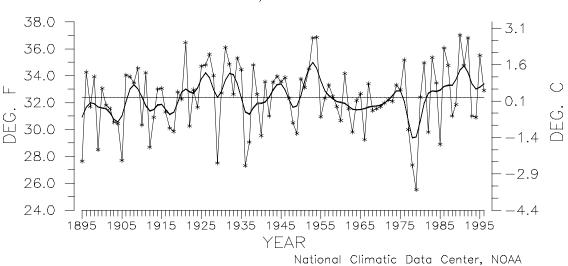
National Climatic Data Center, NOAA

THICK SMOOTH CURVE IS 9-POINT BINOMIAL FILTER.

CONFIDENCE INTERVAL FOR CURRENT YEAR IS INDICATED BY 'X'.

Figure 3

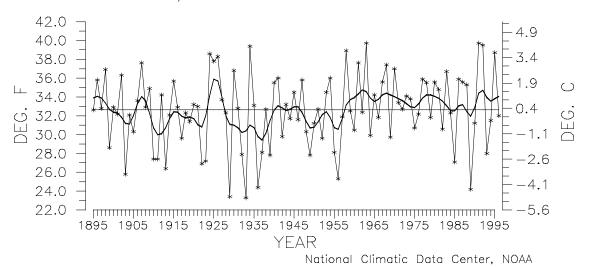
U.S. NATIONAL TEMPERATURE JANUARY-FEBRUARY, 1895-1996



THICK SMOOTH CURVE IS 9-POINT BINOMIAL FILTER.

Figure 4

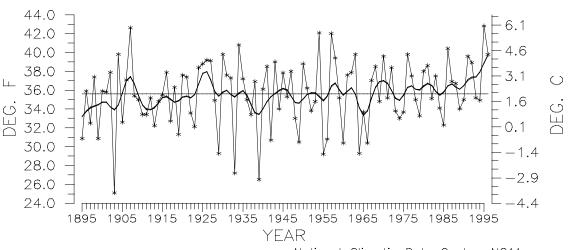
NORTHWEST REGION TEMPERATURE FEBRUARY, 1895-1996



THICK SMOOTH CURVE IS 9-POINT BINOMIAL FILTER.

Figure 5

SOUTHWEST REGION TEMPERATURE FEBRUARY, 1895-1996

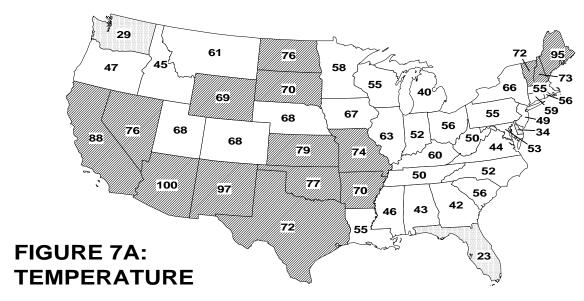


National Climatic Data Center, NOAA

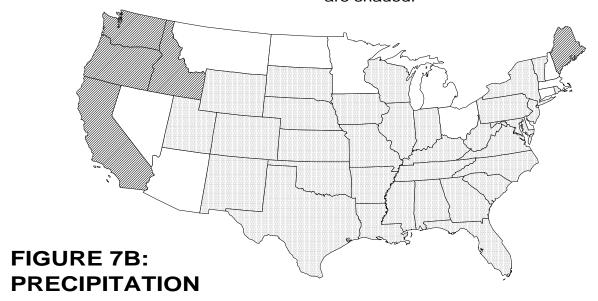
THICK SMOOTH CURVE IS 9-POINT BINOMIAL FILTER.

Figure 6

FEBRUARY 1996 STATEWIDE RANKS



1 = Coldest 102 = Warmest Temperature Ranks for the contiguous United States. Each state is ranked based on its data from 1895-1996. States having a rank in the warm third or cool third of their historical distribution are shaded.



National Climatic Data Center, NOAA

Wet Third

Middle Third

Precipitation Rank Categories for the contiguous United States. Each state is ranked based on its data from 1895-1996. States having a rank in the wet third or dry third of their historical distribution are shaded.

U.S. PERCENT AREA DRY AND WET

JANUARY 1991 THROUGH FEBRUARY 1996

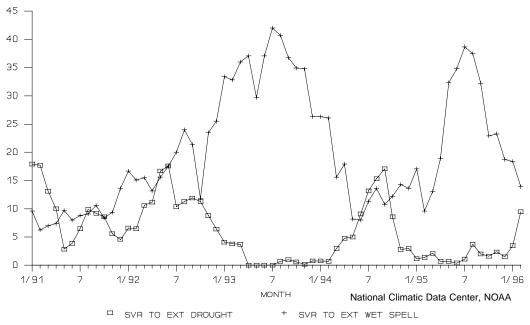
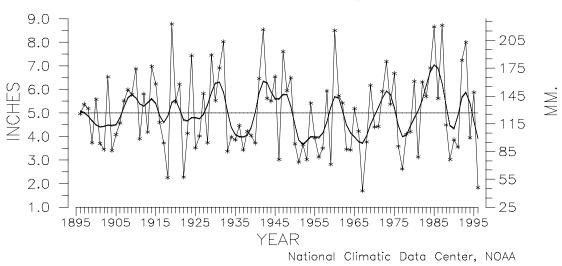


Figure 8

PRIMARY HARD RED WINTER WHEAT BELT PRECIPITATION OCTOBER-FEBRUARY, 1895-96/1995-96



THICK SMOOTH CURVE IS 9-POINT BINOMIAL FILTER.

Figure 9

U.S. NATIONAL TEMPERATURE WINTER (DEC-FEB), 1895-96/1995-96

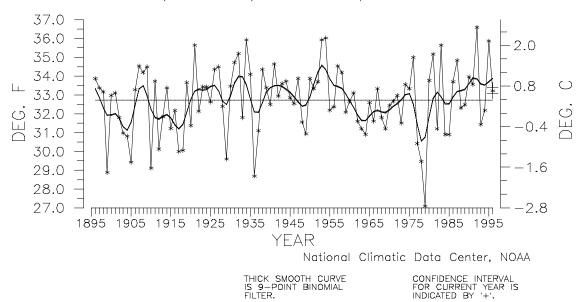


Figure 10



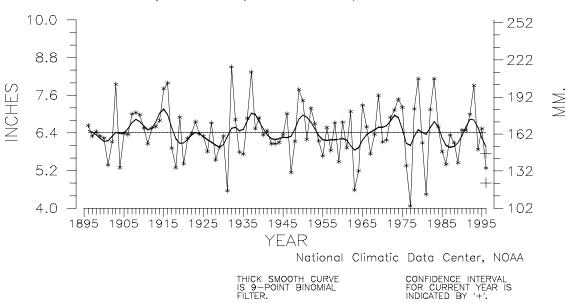
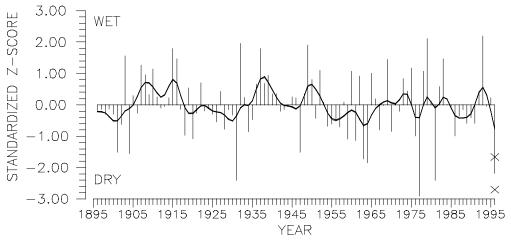


Figure 11

U.S. NATIONAL NORMALIZED PRECIPITATION INDEX WINTER (DEC-FEB), 1895-96/1995-96



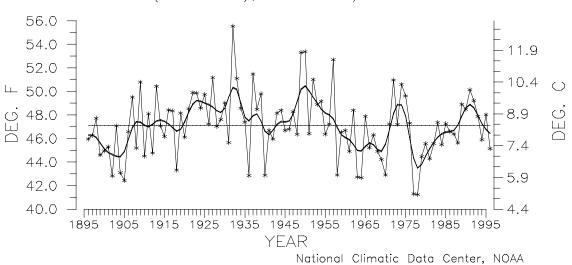
National Climatic Data Center, NOAA

THICK SMOOTH CURVE IS 9-POINT BINOMIAL FILTER.

CONFIDENCE INTERVAL FOR CURRENT YEAR IS INDICATED BY 'X'.

Figure 12

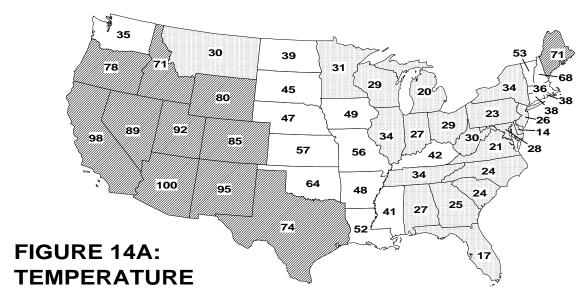
SOUTHEAST REGION TEMPERATURE WINTER (DEC-FEB), 1895-96/1995-96



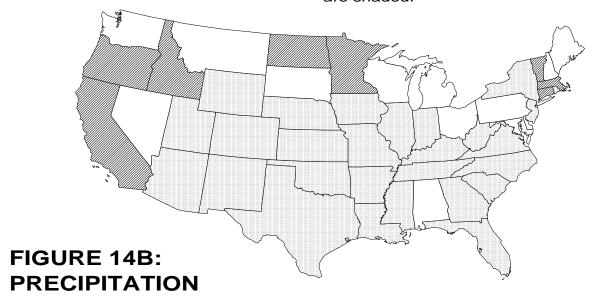
THICK SMOOTH CURVE IS 9-POINT BINOMIAL FILTER.

Figure 13

WINTER (DJF), 1995-96 STATEWIDE RANKS



1 = Coldest 102 = Warmest Temperature Ranks for the contiguous United States. Each state is ranked based on its data from 1895-1996. States having a rank in the warm third or cool third of their historical distribution are shaded.



National Climatic Data Center, NOAA

Wet Third Precipitation Rank Categories for the contiguous United States. Each state is ranked based on its data from 1895-1996. States having a rank in the wet third or dry third of their historical distribution are shaded.

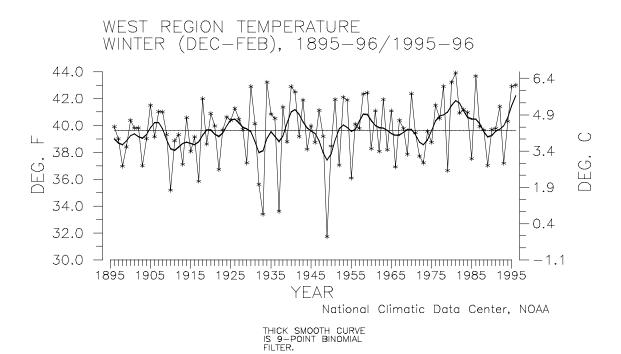


Figure 15